

- i) a substrate with a surface comprising a plurality of assay locations, each assay location comprising an array location comprising a plurality of discrete sites; and
 - ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and
- b) determining the presence or absence of said target analyte.

19. (Twice Amended) A method of determining the presence of one or more target analytes in one or more samples comprising:

- DI/cont*
- a) adding said one or more samples to a first substrate comprising a plurality of assay locations, such that said sample is contained at a plurality of said assay locations;
 - E1* b) contacting said sample with a second substrate comprising:
 - i) a plurality of array locations, each array location comprising a plurality of discrete sites, wherein at least one assay location is in fluid contact with at least one array location; and
 - ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on at least one of said array locations such that said discrete sites each contain no more than one microsphere; and
 - c) determining the presence or absence of said target analyte.

3 20. (Twice Amended) A method according to claim 18, wherein each of said assay locations comprises a library of bioactive agents.

4 21. (Amended) A method according to claim 18, wherein said substrate is a microtiter plate and each assay location is a microtiter well.

5 22. (Amended) A method according to claim 18, wherein each discrete site is a bead well.

6 23. (Amended) A method according to claim 18, wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

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7/ 24. (Twice Amended) A method according to claim 18, wherein at least a first and second microsphere in said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand, whereby said bioactive agent is identified by said identifier binding ligand binding to said decoder binding ligand.

8/ 25. (Amended) A method according to claim 19, wherein said first substrate is a microtiter plate.

9/ 26. (Amended) A method according to claim 19 or 25, wherein said second substrate comprises a plurality of fiber optic bundles comprising a plurality of individual fibers, each bundle comprising an array location, and each individual fiber comprising a bead well.

10/ 27. (Amended) A method according to claim 19, wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

11/ 28. (Amended) A method according to claim 19, wherein each of said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand such that the identification of the bioactive agent can be elucidated.

12/ 29. (Amended) A method according to claim 18 or 19, wherein at least one of said target analytes is a nucleic acid.

13/ Please add Claims 35 and 36.

18/ 35. (New) A method of determining the presence of one or more target analytes in one or more samples comprising:

- a) contacting said one or more samples with a composition comprising:
- i) a composite array comprising a plurality of assay locations, each assay location comprising an array location comprising a plurality of discrete sites; and
 - ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and
- b) determining the presence or absence of said target analyte.

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36. (New) A method of determining the presence of one or more target analytes in one or more samples comprising:

- a) adding said one or more samples to a first substrate comprising a plurality of assay locations, such that said sample is contained at a plurality of said assay locations;
- b) contacting said sample with a second substrate comprising:
 - i) a composite array comprising a plurality of array locations, each array location comprising a plurality of discrete sites, wherein at least one assay location is in fluid contact with at least one array location; and
 - ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent, wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and
- c) determining the presence or absence of said target analyte.--